Research Product 85-24

Development of a Rifle Marksmanship Training Program for Units

ARI Field Unit at Fort Benning, Georgia
Training Research Laboratory

June 1985

U. S. Army Research Institute for the Behavioral and Social Sciences

U. S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the Deputy Chief of Staff for Personnel

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Research accomplished under contract
for the Department of the Army

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Litton Systems, Inc.

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UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ARI Research Product 85-24	2. GOVT ACCESSION NO. ADA 170997	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) DEVELOPMENT OF A RIFLE MARKSMANSHIP TRAINING PROGRAM FOR UNITS		5. TYPE OF REPORT & PERIOD COVERED Interim 06/77-12/83 6. PERFORMING ORG. REPORT NUMBER ---
7. AUTHOR(s) Arthur D. Osborne, Kenneth L. Evans, Harry A. Lucker, and Gary P. Williams		8. CONTRACT OR GRANT NUMBER(s) MDA 903-80-C-0345
9. PERFORMING ORGANIZATION NAME AND ADDRESS Mellonics Systems Development Division, Litton Systems, Inc. 1001 W. Maude Avenue, P.O. Box 3407 Sunnyvale, CA 94088-3407		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q263743A794
11. CONTROLLING OFFICE NAME AND ADDRESS ARI Fort Benning Field Unit P.O. Box 2086 Fort Benning, GA 31905-0686		12. REPORT DATE June 1985 13. NUMBER OF PAGES 17
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) U.S. Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue Alexandria, Virginia 22333-5600		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE ---

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

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18. SUPPLEMENTARY NOTES

Dr. Seward Smith, Contracting Officer's Representative,
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

advanced rifle marksmanship	dry fire	marksmanship targets
automatic fire	field fire	marksmanship training devices
ballistics	known distance firing	
basic rifle marksmanship	M16A1 rifle	
down-range feedback	marksmanship instructor training	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This research product presents an M16A1 rifle marksmanship training program for U.S. Army units. It is compatible and fully integrated with recent revisions made in the basic and advanced rifle marksmanship training programs. The usefulness of the unit marksmanship program has been demonstrated through field testing and/or implementation within selected units in West Germany, Korea, Alaska, Hawaii, and within units located at Forts Benning, Bragg, Campbell, Hood, Lewis, Polk, Riley, and Stewart.

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Item 19 (cont'd)

moving target engagement training
night fire
preparatory marksmanship training
protective mask firing
qualification firing
quick fire
rifle marksmanship training
rifle sights
scaled silhouette targets
shot group analysis
Training Effectiveness Analysis
unit rifle marksmanship
Weaponeer
zeroing

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Office, Deputy Chief of Staff for Personnel
Department of the Army

June 1985

Army Project Number
2Q263743A794

Education and Training

FOREWORD

The Fort Benning Field Unit of the U.S. Army Research Institute since 1976 has conducted an ongoing program of research designed to improve the effectiveness of M16A1 rifle marksmanship training at basic, advanced, and unit levels. The present research product documents the development and evaluation of a comprehensive and flexible rifle marksmanship training program for units. As a major part of this effort, the rifle marksmanship training material contained in change 3 to FM 23-9, M16A1 Rifle and Rifle Marksmanship, was developed to be used as the primary document for the development and implementation of rifle marksmanship programs within units Army-wide. The present research was coordinated with the U.S. Army Infantry School, the proponent agency for M16A1 rifle marksmanship training program development.

EDGAR M. JOHNSON
Technical Director

DEVELOPMENT OF A RIFLE MARKSMANSHIP TRAINING PROGRAM FOR UNITS

EXECUTIVE SUMMARY

Requirement:

To improve the effectiveness of M16A1 rifle marksmanship training in U.S. Army units, through the development and evaluation of a unit rifle marksmanship training program that is compatible and integrated with Basic Rifle Marksmanship (BRM) and Advanced Rifle Marksmanship (ARM) instruction.

Procedure:

Based upon relatively recent modifications made in BRM and ARM training as a function of previous research, a rifle marksmanship training program was developed to be used by combat, combat support, and combat service support units of the Active and Reserve Components. While allowing for flexibility among units with a wide range of training priorities, time, and resources, the program was designed to both reinforce and further develop those marksmanship skills taught in BRM and ARM.

Critical components of the unit program were informally evaluated in a series of field tests conducted with selected units at Forts Benning, Bragg, and Riley. During the course of evaluation, procedural refinements to the program were made.

Findings:

Using marksmanship performance measures obtained during a U.S. Army Forces Command competitive exercise, substantial increases in shooting performance were demonstrated after less than eight hours of instruction. To assist units in the implementation of a training program appropriate for their mission and level of resources, as well as to increase the effectiveness of internal unit marksmanship instructors, a unit rifle marksmanship training program was developed.

Utilization of Findings:

This research product reviews the development and evaluation of a rifle marksmanship training program for units Army-wide. Implementation of this program and use of the accompanying marksmanship training material may lead to improvement in the effectiveness of current unit rifle marksmanship training procedures.

DEVELOPMENT OF A RIFLE MARKSMANSHIP TRAINING PROGRAM FOR UNITS

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DEVELOPMENT OF A RIFLE MARKSMANSHIP TRAINING PROGRAM FOR UNITS

INTRODUCTION

In 1977 the U.S. Army Research Institute Field Unit at Fort Benning and its resident contractor, Litton Mellonics, initiated a systematic research program devoted to M16A1 rifle marksmanship training. Based upon a growing concern that existing Basic Rifle Marksmanship (BRM) training was not producing qualified marksmen for U.S. Army units, marksmanship training was examined at basic, advanced, and unit levels. The primary goal of this research program, conducted under the joint sponsorship of the Directorate of Training Developments of the U.S. Army Infantry School (USAIS) and the U.S. Army Forces Command (FORSCOM), was to develop and validate an integrated set of more effective marksmanship training programs geared to combat marksmanship requirements.

Rifle marksmanship training in the U.S. Army is conducted in three separate, though conceptually related, Programs of Instruction (POIs): BRM, Advanced Rifle Marksmanship (ARM), and Unit Rifle Marksmanship. BRM training focuses on teaching those common rifle marksmanship skills needed by every soldier in the U.S. Army. All initial entry soldiers receive BRM training, which is provided at each Army Training Center (ATC). A minimum performance standard, measured on a prescribed rifle qualification course of fire, must be met by all BRM trainees. In contrast, ARM focuses on teaching more advanced marksmanship skills, in addition to BRM skills, needed by soldiers having the 11B (Light Weapons Infantryman) Military Occupational Specialty (MOS). ARM training is conducted only at Fort Benning, Georgia, as part of the Advanced Individual Training (AIT) portion of the Infantry One Station Unit Training (OSUT) POI.

Unit rifle marksmanship training is conducted by all U.S. Army units worldwide. Its purpose is twofold. First, unit training attempts to maintain soldier proficiency in the marksmanship skills acquired in BRM and ARM. Each soldier must annually meet a minimum performance standard on a rifle qualification course of fire. Second, each unit must provide training to develop other marksmanship skills that may be required as a function of their particular unit mission.

INITIAL RESEARCH

Initial efforts focused on the nature of the combat threat, the required rifle marksmanship tasks to be performed, how performance on these tasks could be measured, and a determination of whether or not existing training prepared soldiers to meet the threat (Maxey & George, 1977; Maxey & Sweezy, 1977; Klein & Tierney, 1978; Smillie & Chitwood, 1980). These reports indicated that the rifle defeatable threat encompassed briefly exposed personnel targets, both stationary and moving, within a range of 300 meters. It was also clearly apparent that existing rifle marksmanship training was not adequately preparing soldiers to meet this threat.

A series of field experiments was then conducted to determine the effects of potential solutions to some of these training problems. Using airborne soldiers from a FORSCOM unit preparing for their annual rifle qualification in September of 1978, three different training programs were compared. In terms of the average number of hits obtained during a record fire scenario, it was found that a training program providing greater performance feedback and increased instructor quality and quantity was associated with a significantly higher ($p < .001$) level of measured performance (Evans, Thompson & Smith, 1980). This training program was subsequently published by the U.S. Army Marksmanship Unit as a recommended interim unit marksmanship POI for FORSCOM (U.S. Army Forces Command, 1979).

Weaknesses in marksmanship training at the unit level were partly attributable to program deficiencies at the initial entry level. It was apparent that many soldiers had not acquired or retained basic rifle marksmanship skills from BRM training. For this reason, research and development efforts were first focused on the improvement of the BRM POI. Major problems in existing BRM training methods were identified (Maxey & Dempster, 1978; Smith, Osborne, Thompson & Morey, 1980), the capabilities of the M16A1 rifle were explored (Osborne, Morey & Smith, 1980), and improved training procedures were evaluated and refined (Smith, Thompson, Evans, Osborne, Maxey & Morey, 1980; Thompson, Smith, Morey & Osborne, 1980). Important revisions in the BRM POI were made due to the findings of this comprehensive research program, including the following:

1. A revised 25-meter zeroing target was introduced which was easier to understand and provided cues about shooting performance at more distant ranges.

2. Scaled silhouette target exercises were added which improved the feedback provided to the trainee and which served as a diagnostic checkpoint prior to field firing at pop-up targets.

3. A down range feedback exercise was also added in order to increase the precision and timeliness of feedback received by the firer regarding the location of hits and misses. This exercise functioned as a transition between 25-meter firing at paper targets and field firing at pop-up targets.

4. Instructor emphasis was placed on a simplified set of four marksmanship fundamentals: steady position, aiming, breath control, and trigger squeeze.

As proponent for M16A1 rifle marksmanship training, the Assistant Commandant of the USAIS approved the new BRM program in 1980 (U.S. Army Infantry School, 1980). Implementation of the program was completed at all ATCs in 1982. A comparison of the features in the previous and new BRM programs is shown in Table 1.

Table 1

Comparison of the Previous Basic Rifle Marksmanship Training Program and the New M16A1 Basic Rifle Marksmanship Program of Instruction

PREVIOUS MARKSMANSHIP TRAINING PROGRAM				NEW MARKSMANSHIP TRAINING PROGRAM			
PERIOD	SUBJECT	HOURS	ROUNDS	PERIOD	SUBJECT	HOURS	ROUNDS
1	Orientation and Mechanical Training	4	0	1	Introduction and Mechanical Training	4	0
2	Preparatory Marksmanship Training	3	9	2	Fundamentals of Shooting (Dry Fire)	4	0
3	Preparatory Marksmanship Training	3	9	3	Fundamentals of Shooting (Live Fire)	4	9
4	Twenty-Five Meter Firing	4	24	4	Practice Firing (Zero)	8	18
				5	Practice Firing (25-m Silhouette)	2	18
				6	Downrange Feedback (75-m and 175-m)	8	30
5	Introduction to Field Firing	4	42	7	Field Fire (Single Targets and Target Detection)	4	42
6	Field Firing	4	36	8	Field Fire (Single and Multiple Targets)	4	36
				9	Confirmation of Zero and Timed Fire (25-m Silhouette)	4	32
7	Practice Record Fire	4	40	10	Practice Record Fire	4	40
8	Record Fire	5	40	11	Record Fire/Combat Fire	7	90
9	Twenty-Five Meter Automatic Firing	3	45	12	Automatic Firing	2	21
				13	Protective Mask Firing	2	20
10	Night Record Firing	3	89	14	Night Firing	3	30
	Totals	37	334		Totals	60	386

Based upon observation, participation, and informal interviews with instructor personnel, major problems were also identified in the ARM POI existing in 1981 (Evans & Schendel, 1982). A revised ARM POI was then developed and implemented at Fort Benning, Georgia in 1982, as part of the Infantry OSUT POI. Important changes in the new program include the following:

1. The scope of ARM was expanded to include training in areas that were not addressed previously. The previous ARM POI was limited to automatic fire and night fire only. Based upon an extensive analysis of the expected role of small arms in infantry missions, training in four additional areas was included in the new POI: quick fire, rapid semi-automatic and suppressive fire, firing with the protective mask, and firing at moving personnel targets.

2. Modifications were made to automatic fire and night fire training in order to make it more appropriate from both a combat realism and learning/cognition viewpoint.

3. The amount of performance feedback given to soldiers was increased as much as possible. For example, the amount of firing conducted with scaled silhouette targets on 25-meter ranges, where soldiers can walk downrange to inspect and score targets, was increased. In addition, soldiers walk downrange to inspect and score targets during both quick fire and night fire.

A comparison of the features in the previous and new ARM programs is shown in Table 2. Currently, the new ARM POI continues to be monitored and minor modifications will be made, as needed, in order to improve program effectiveness.

Table 2

Comparison of New and Previous Advanced Rifle Marksmanship Training Programs

PREVIOUS ARM PROGRAM				NEW ARM PROGRAM			
PERIOD	SUBJECT	HOURS	ROUNDS	PERIOD	SUBJECT	HOURS	ROUNDS
1	Obtain Battlesight Zero with Bipod	4	39	1	Quick Fire	4	30
2	Automatic Rifle Field Fire	4	96	2	Rapid Semi-Automatic and Suppressive Fire	4	50
3	Automatic Rifle Qualification (Practice)	4	96	3	Automatic Rifle Field Fire[1]	4	96
4	Automatic Rifle Qualification (Record)	4	96	4	Night Fire	4	54
5	Night Fire	3	27	5	Engage Moving Personnel Targets	8	72
	Total	19	354		Total	24	302

[1]The final 15 rounds in automatic field fire are fired while wearing the M17 protective mask.

UNIT RIFLE MARKSMANSHIP TRAINING

Unit rifle marksmanship training must consider both individual and collective firing proficiency. The individual portion of the unit marksmanship program is designed to insure skill retention and improvement, while the collective portion of the program is focused on the application of those skills in a group tactical environment. Unit marksmanship programs must be designed with flexibility, in order to support the particular training environment of various units. Because time, facilities, and ammunition available for training vary among Active and Reserve Component units of the Army, marksmanship training must vary also.

In order to make unit marksmanship training compatible and fully integrated with the revisions made in the BRM and ARM programs, guidelines were developed for the conduct of marksmanship training in units Army-wide. These guidelines have been incorporated into Change 3 to Field Manual 23-9, M16A1 Rifle and Rifle Marksmanship. Table 3 outlines the individual firing portion of a sample annual unit training program. Since it is recommended that most units conduct marksmanship training at least once every quarter, this program includes three days of training in conjunction with annual qualification, a two-day refresher, and two one-day refreshers. With the exception of quick fire, marksmanship topics parallel those taught in the BRM program. Mechanical training/dry fire, shot grouping/zero, known distance (KD) or scaled silhouette firing, and protective mask firing are to be conducted quarterly. Field fire, practice record fire, competition firing, and night fire are scheduled biannually. Record fire, automatic fire, and quick fire are conducted annually.

Table 3

Summary of the Individual Portion of an Annual
Unit Rifle Marksmanship Training Program

ANNUAL UNIT TRAINING PROGRAM				
TRAINING	3 DAYS _____QTR	1 DAY ____QTR	2 DAYS _____QTR	1 DAY ____QTR
Mechanical Training/ Dry Fire	X	X	X	X
Shot Grouping/Zero	X	X	X	X
Known Distance (Note 1)	X	X	X	X
Scaled Silhouette (Note 2)	X			
Field Fire	X		X	
Protective Mask Fire	X	X	X	X
Practice Record Fire	X		X	
Record Fire	X			
Competition Firing	X		X	
Night Fire		X		X
Automatic Fire		X		
Quick Fire				X

Note 1: Used in place of scaled silhouette exercise.

Note 2: Used when a known distance range is not available.

AMMUNITION: The annual ammunition expenditure for individual marksmanship training is 750 rounds, 5.56 ball, based on training requirements for an Infantry rifleman (TC 25-3, Training Ammunition).

PROGRAM EVALUATION

Selected components of the unit training program were pilot tested with the 82nd Airborne Division, Fort Bragg, North Carolina, during three different weeks in 1981 and 1982. Further testing was conducted with the 1st Infantry Division, Fort Riley, Kansas during one week in 1982. Later in 1982, a more extensive evaluation of the unit program was conducted with two companies of the 197th Infantry Brigade, Fort Benning, Georgia. A two-day instructor training program was initially conducted with non-commissioned officer personnel. Instructor training included classroom instruction, preparatory marksmanship/dry fire exercises, and 25-meter live firing. Following instructor training, a 24-hour unit marksmanship program was conducted.

The first day of unit training was devoted to preparatory marksmanship and 25-meter instructional firing. Marksmanship fundamentals and the principles of zeroing were introduced. Supervised dry firing, shot grouping with the "ball and dummy" technique, and zeroing were then conducted. Finally, each soldier fired the FORSCOM Commander's Company Level Marksmanship Competition twice, once for practice and once for record (FORSCOM Circular 350-81-1). This competitive exercise consists of ten rounds fired at five 250-meter silhouette targets scaled for 25 meters (FORSCOM C-10, 1 Jan 81). Maximum total score for each firer was 100 points. At the conclusion of this single day of training, company average scores for the record firing were 59.70 and 54.52. Three months before this training was conducted, the same two companies had fired averages of 11.91 and 9.87, respectively, on the same competitive exercise. The remainder of the unit training program tested included 12 hours of KD firing and 4 hours of night fire.

In addition to these program evaluations, components of the program have been implemented by several units. In the majority of cases, training material was provided by mail and additional coordination was conducted by telephone. This type of implementation has occured within selected units in West Germany, Korea, Alaska, Hawaii, and within units located at Forts Hood, Lewis, Stewart, Campbell, and Polk.

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